

Joint EC-IAEA Nuclear Science Training Course on Nuclear Science with NUCLEONICA, Monaco, 12-15th Oct. 2010



The Nucleonica Nuclear Science Portal: Overview

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What is Nucleonica?

Who is Nucleonica aimed at?

How can Nucleonica help you?

Nucleonica Architecture & Logical Structure...

Nucleonica Knowledge Objects

NUCLEONICA as a platform for scientific applications development

Key Advantages of Nucleonica

...Getting Started! Mass Activity Calculator

What is Nucleonica?

- As a result of recent developments on issues such as energy security and sustainability, nuclear safety, security, and non-proliferation, and protection of the environment, we are witnessing a resurgence of interest in nuclear power and the nuclear sciences in general.
- The next generation of reactor energy systems aimed at addressing many of these issues - the so-called *Generation IV* systems - are expected to become available for commercial introduction in the period between 2015 and 2030 or beyond.
- In order to support this renewed interest in the nuclear sciences, we will need a nuclear skills renaissance and it is within this context that the Nucleonica nuclear science web portal (www.nucleonica.net) has been developed.
- With its roots in the traditional paper-based Karlsruhe Nuclide Chart, Nucleonica has grown to become the leading online resource in the nuclear sciences. Nucleonica is particularly suitable for education and training of young scientists, engineers and technicians in the nuclear domain.



Who is Nucleonica aimed at?

- Nucleonica is aimed at scientists, engineers and technical personnel working in the fields of nuclear power, health physics, radiation protection, nuclear and radiochemistry, decommissioning, nuclear medicine, etc. Nucleonica is particularly suitable for education and training of young scientists, engineers and technicians in the nuclear domain.
- It can also be used by professionals for everyday calculations, obtaining quick results in various fields of applications and testing, validating and verifying complex computer models.
- Nucleonica also provides a range of consultancy services and industry cooperations. Examples of some recent studies include an analysis of the handling problems arising in the dismantling of radioactive sources, a decommissioning study of neutron sources, shielding analysis for a minor actinide laboratory, and a comparison of the radiotoxicities of wastes from fission, fusion, and coal fired power stations.
- Our clients include the Bundesamt für Strahlenschutz (BfS), Fichtner Engineering and Consulting, and Europol.



How can Nucleonica help you?

- Nucleonica provides you with user friendly access to the latest reference data from internationally evaluated nuclear data.
- A unique feature is the wide range of web-based nuclear science applications for decay calculations, dosimetry & shielding, etc.
- A variety of networking tools are provided for scientific collaboration.
- In addition Nucleonica offers a range of introductory and advanced training courses in various areas of nuclear science. One of the main aims of these courses is to contribute to establishing a safety culture among the scientists and especially the younger scientists. This safety culture is a necessary prerequisite for a general acceptance of nuclear energy worldwide.



Nucleonica is already being used by thousands of scientists and students worldwide in over 92 countries. Due to its advanced IT features, user friendly and intuitive environment, the platform has recently been endorsed by the Sustainable Nuclear Energy Technology Platform (www.snetp.eu):

“Nucleonica plays ... an important role in making nuclear education more attractive and in building nuclear knowledge for a new generation of engineers and scientists”



Nucleonica...

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 ... web driven nuclear science

Wednesday, September 23, 2009

Home

username Login

Home

Free Access

Nucleonica [Blog]

Nucleonica [wiki]

Karlsruhe Nuclide Chart

News Releases

Educational Resources

Training Courses

Ask an Expert

FAQ

About Us

Contact

Nucleonica - web driven nuclear science



Nucleonica is a new nuclear science web portal from the European Commission's Joint Research Centre. The portal provides a customisable, integrated environment and collaboration platform for the nuclear sciences using the latest internet "Web 2.0" dynamic technology.

Nucleonica is aimed at professionals, academics and students working with radionuclides in fields as diverse as the life sciences (e.g. biology, medicine, agriculture), the earth sciences (geology, meteorology, environmental science) and the more traditional disciplines such as nuclear power, health physics and radiation protection, nuclear and radiochemistry, and astrophysics. It is also used as a knowledge management tool to preserve nuclear knowledge built up over many decades by creating modern web-based versions of so-called legacy computer codes.

Nucleonica provides "software as a service" on the web rather than through installed software, adding a greater level of stability and security and avoiding version compatibility and update problems. In addition, all Nucleonica's web applications are browser and operating system independent and can therefore be accessed by most web browsers.

Nucleonica offers the following main features:

NUCLEONICA HOT TOPICS

>> New Nucleonica Training Course... ITRAC-2

August 17, 2009

The 2nd Advanced Training Course on Illicit Trafficking and Radiological Consequences (ITRAC-2) with NUCLEONICA will take place at ITU, Karlsruhe from

KARLSRUHE NUCLIDE CHART

>> Karlsruhe Nuclide Chart special event on 9th Dec. 2008

Januar 09, 2009

New book now available!...for more information click link

NUCLEAR NEWS

N-energy benefits should not remain confined to few: PM

SEP 30 Manmohan Singh today said benefits of atomic energy should not remain confined to a 'privileged few' as it was vital to meet power requirements of developing countries. [...]

For sale: Fisherman's cottage in nature reserve (Oh, and it's next to two nuclear power stations)

SEP 30 For sale: Fisherman's cottage in nature reserve (Oh, and it's next to two nuclear power stations) [...]

Analysis: Iran plant could defer Israel strike

SEP 30 JERUSALEM (AP) – It may seem counterintuitive, but the news that Iran has a second, clandestine uranium enrichment plant, and has just test-fired long-range missiles, could actually put off any plans [...]

India's allotment for nuclear parks hailed

SEP 30 The US India Business Council has welcomed India's move to reserve sites for the US commercial nuclear technology and described it as a significant step towards implementing the US-India civil nuclear [...]

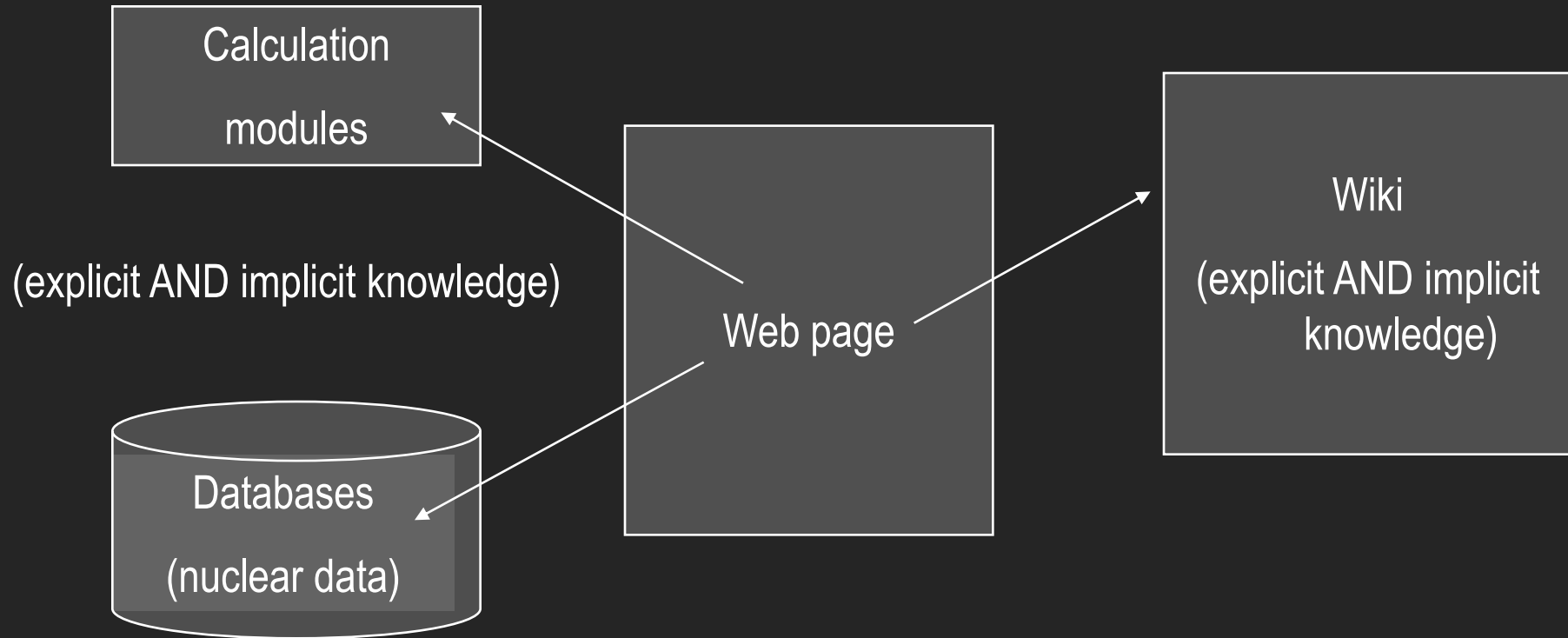
Bulgaria Belene Nuclear Plant to Bring EUR 80 B over 60 years

SEP If built, the Bulgarian B...



The NUCLEONICA Nuclear Science Portal

Nucleonica Architecture & Logical Structure...



The NUCLEONICA Structure

Nucleonica Contents

What is Nucleonica?

Nuclear Data

Nuclide Explorer

DataSheets

Nuclear Data Retrieval

Fission Yields

Universal Nuclide Chart

Karlsruhe Nuclide Chart

Tools

webGraph

Scientific Calculator and Conference Calendar

Nuclide Mixtures

Gamma Library Creation

Nucleonica Scripting

Applications

10. Mass Activity Calculator

11. Decay Engine

12. Decay Engine for Large Nuclide Sets

13. Gamma Dosimetry & Shielding

14. Range & Stopping Power

15. webKORIGEN

16. Neutron Activation with webKORIGEN

17. Gamma Spectrum Generator

18. Cambio File Converter

19. WESPA web spectrum analyser

20. In Silico Dosimetry

Networking

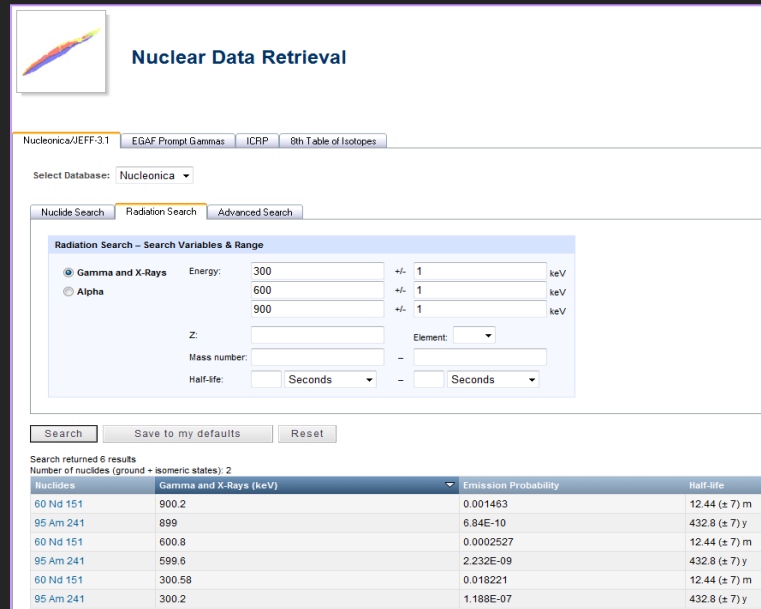
Register as a Nucleonica User

Wiki, Blog, Forum and Nuclear News

Nuclear Science Training Courses

Four Pillars of NUCLEONICA: Nucleonica's "Learning Centres"

- Data Centre



Nuclear Data Retrieval

Nucleonica/JEFF-3.1 EGAF Prompt Gammas ICRP 8th Table of Isotopes

Select Database: Nucleonica

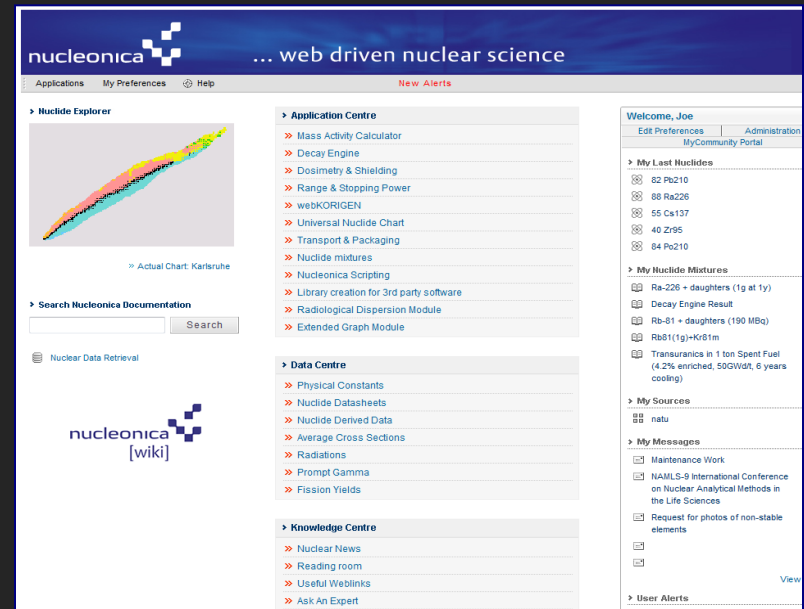
Radiation Search - Search Variables & Range

☒ Gamma and X-Rays Energy: 300 +/- 1 keV
☐ Alpha 600 +/- 1 keV
 900 +/- 1 keV
 Z: Element:
 Mass number:
 Half-life: Seconds - Seconds

Search returned 6 results
 Number of nuclides (ground + isomeric states): 2

Nuclides	Gamma and X-Rays (keV)	Emission Probability	Half-life
60 Nd 151	900.2	0.001463	12.44 (± 7) m
95 Am 241	899	6.84E-10	432.8 (± 7) y
60 Nd 151	600.8	0.0002527	12.44 (± 7) m
95 Am 241	599.6	2.232E-09	432.8 (± 7) y
60 Nd 151	300.58	0.018221	12.44 (± 7) m
95 Am 241	300.2	1.188E-07	432.8 (± 7) y

- Application Centre



nucleonica ... web driven nuclear science

Applications My Preferences Help New Alerts

Nuclide Explorer

Actual Chart: Karlsruhe

Search Nucleonica Documentation

Nuclear Data Retrieval

Application Centre

- Mass Activity Calculator
- Decay Engine
- Dosimetry & Shielding
- Range & Stopping Power
- webKORIGEN
- Universal Nuclide Chart
- Transport & Packaging
- Nuclide mixtures
- Nucleonica Scripting
- Library creation for 3rd party software
- Radiological Dispersion Module
- Extended Graph Module

Data Centre

- Physical Constants
- Nuclide Datasheets
- Nuclide Derived Data
- Average Cross Sections
- Radiations
- Prompt Gamma
- Fission Yields

Knowledge Centre

- Nuclear News
- Reading room
- Useful Weblinks
- Ask An Expert

Welcome, Joe

[Edit Preferences](#) [Administration](#)
[MyCommunity Portal](#)

My Last Nuclides

- 82 Pb210
- 86 Ra226
- 55 Cs137
- 40 Zr95
- 64 Po210

My Nuclide Mixtures

- Ra-226 + daughters (1g at 1y)
- Decay Engine Result
- Rb-81 + daughters (190 MBq)
- Rb81(1g)+K81m
- Transuramics in 1 ton Spent Fuel (4.2% enriched, 50GWdt, 6 years cooling)

My Sources

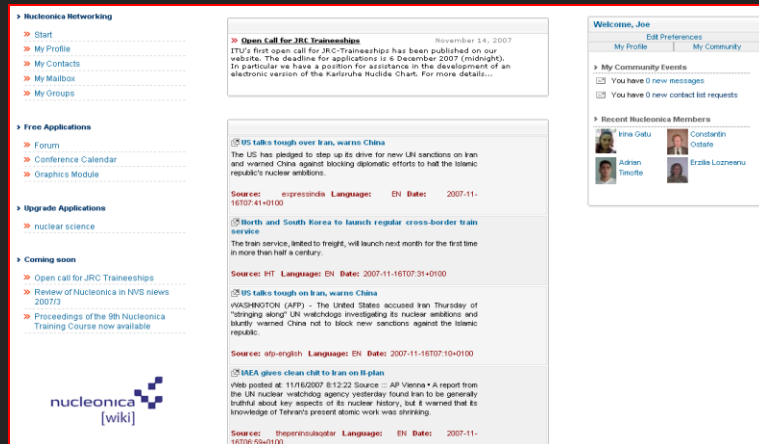
- natu

My Messages

- Maintenance Work
- IAEA-5-9 International Conference on Nuclear Analytical Methods in the Life Sciences
- Request for photos of non-stable elements

User Alerts

- Knowledge Centre



Nucleonica Networking

- Start
- My Profile
- My Contacts
- My Mailbox
- My Groups

Free Applications

- Forum
- Conference Calendar
- Graphics Module

Upgrade Applications

- Nuclear science

Coming soon

- Open call for JRC Traineeships
- Review of Nucleonica in NVS news 2007/3
- Proceedings of the 9th Nucleonica Training Course now available

Open Call for JRC Traineeships

11/16/2007 8:12:22 Source: AP Vienna - A report from the IAEA gives a clear call to Iran on its plan to develop a nuclear reactor. The report states that the IAEA has been investigating its nuclear activities and that it is not clear if Iran is developing a nuclear reactor. The report also states that the IAEA is not clear if Iran is developing a nuclear reactor.

US talks tough over Iran, warns China

The US has pledged to step up its drive for new UN sanctions on Iran and warned China against blocking diplomatic efforts to halt the Islamic republic's nuclear ambitions.

North and South Korea to launch regular cross-border train service

The train service, linked to freight, will launch next month for the first time in more than half a century.

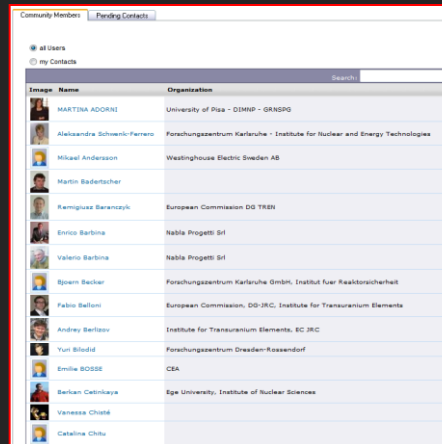
IAEA gives clear call to Iran on its plan

Web posted at: 11/16/2007 8:12:22 Source: AP Vienna - A report from the IAEA gives a clear call to Iran on its plan to develop a nuclear reactor. The report states that the IAEA has been investigating its nuclear activities and that it is not clear if Iran is developing a nuclear reactor. The report also states that the IAEA is not clear if Iran is developing a nuclear reactor.

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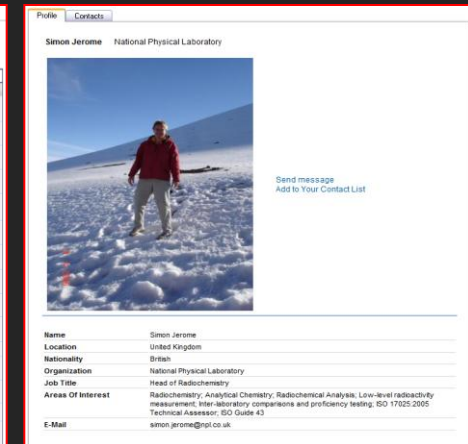
- Community/Networking Centre



Community Members Pending Contacts

all users my contacts

Image	Name	Organization
	MARTINA ADORNI	University of Pisa - DMRP - GRNSG
	Alejandro Schenker-Ferrero	Forschungszentrum Karlsruhe - Institute for Nuclear and Energy Technologies
	Mikael Andersson	Westinghouse Electric Sweden AB
	Martin Badertscher	Westinghouse Electric Sweden AB
	Ramiquss Salamczyk	European Commission DG TRIS
	Enrico Barbina	Nable Progett Srl
	Valerio Barbina	Nable Progett Srl
	Sören Becker	Forschungszentrum Karlsruhe GmbH, Institut fuer Reaktorsicherheit
	Fabio Belloni	European Commission, DG-JRC, Institute for Transuranium Elements
	Andrey Berlov	Institute for Transuranium Elements, EC JRC
	Yuri Blodid	Forschungszentrum Dresden-Rossendorf
	Enrico Bosse	CEA
	Serban Celnik	Ege University, Institute of Nuclear Sciences
	Yvesse Chetani	
	Catalina Chiu	

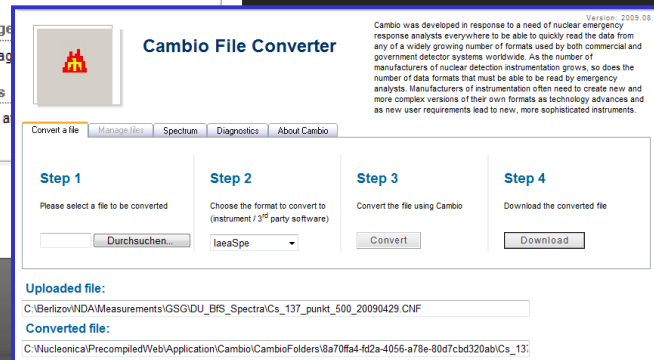
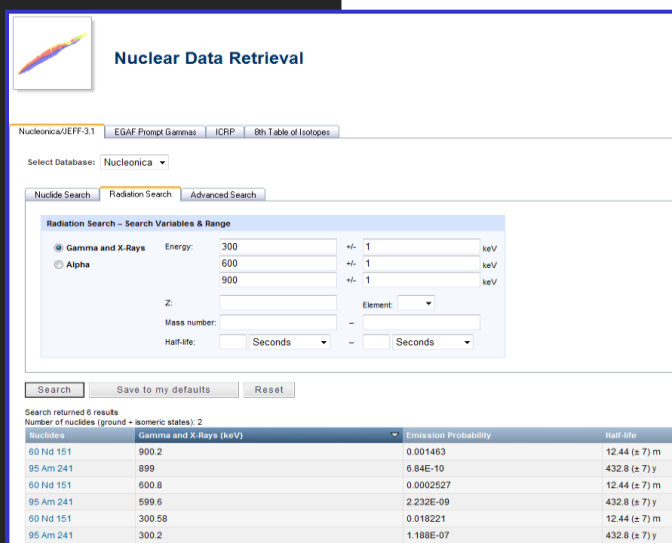
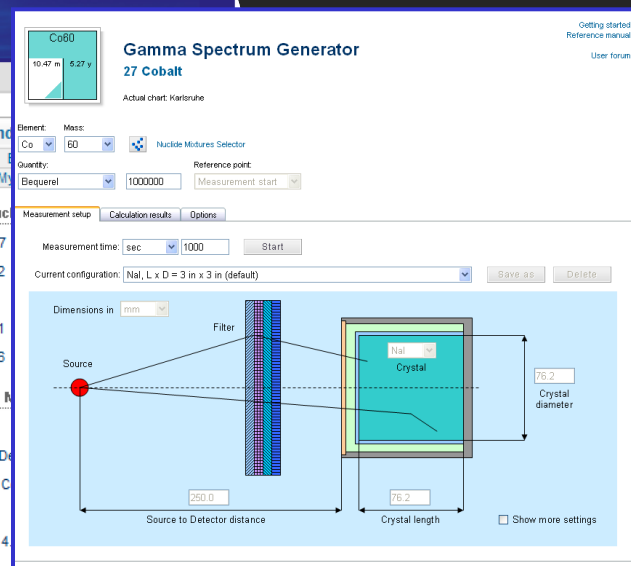
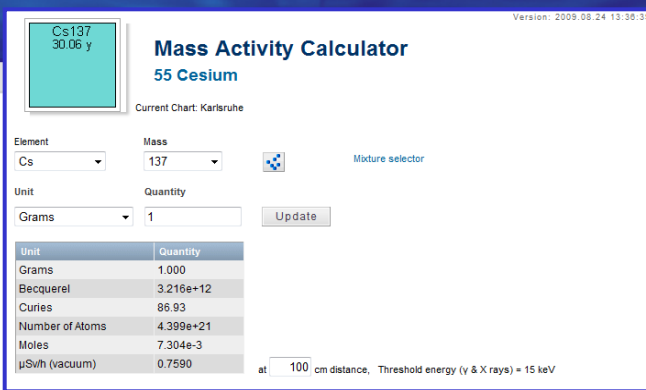
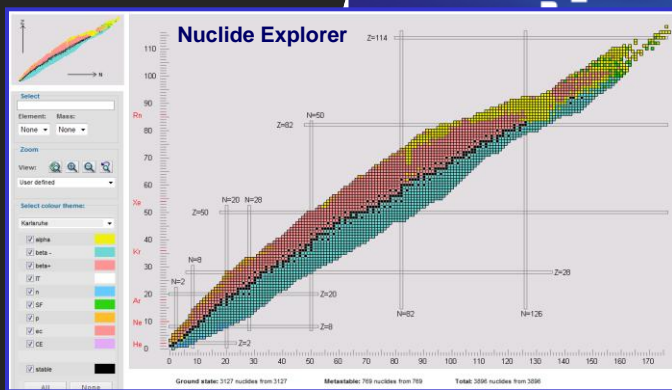


Simon Jerome National Physical Laboratory

Send message Add to Your Contact List

Name Simon Jerome
Location United Kingdom
Rationality Britain
Organization National Physical Laboratory
Job Title Head of Radiochemistry
Areas Of Interest Radiochemistry, Analytical Chemistry, Radiochemical Analysis, Low-level radioactivity measurement, Inter-laboratory comparisons and proficiency testing, ISO 17025:2005
E-Mail simon.jerome@npl.co.uk

Nucleonica's unique feature: Web-based Nuclear Science Applications



NUCLEONICA as a platform for scientific applications development

- Currently NUCLEONICA consists of individual modules
 - Modules can be “combined” for batch processing through the NUCLEONICA scripting language
 - Open up NUCLEONICA to external developers
- checklist of tools required:
- access to the NUCLEONICA databases
 - a testing environment where the developer and the NUCLEONICA team can test new application
 - an upload facility whereby the developer can upload the application to the NUCLEONICA platform

Recent Example: development of an In silico dosimetry module




Conclusions: Key Advantages of Nucleonica

- Keep informed with the latest news on nuclear issues
- Use internationally evaluated nuclear data in your work
- Extensive range of nuclear science applications
- Manage all your data in a single browser-based system and keep track of your recent activities
- Prepare a lecture or a training course with Nucleonica materials (graphics. etc.)
- Prepare publication quality scientific graphs
- Stay in contact with your colleagues from previous employment, workshops or conferences
- Meet scientists from your areas of interest and build up an international contact list and represent yourself and your Institute/Organisation in the international science community



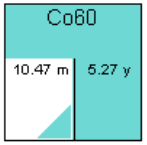
...Getting Started!

Mass Activity Calculator



... web driven nuclear science

[Applications](#)
[Data](#)
[Knowledge](#)
[My Preferences](#)
[Print](#)
[Help](#)
[New Browser](#)



Co60
10.47 m 5.27 y

Mass Activity Calculator

27 Cobalt


Current Chart: Karlsruhe

Element

Co

Mass

60



Mixture selector

Quantity

1E+06

Unit

Activity (Bq)

Convert

Convert to:	Quantity
Mass (g)	2.388e-8
Activity (Bq)	1.000e+6
Activity (Ci)	2.703e-5
Number of atoms	2.400e+14
Mole of atoms	3.985e-10
Gamma dose rate (μSv/h)	0.3370
Committed Effective Dose Equivalent, e(50)inhalation (μSv)	3.100e+4
Committed Effective Dose Equivalent, e(50)ingestion (μSv)	3.400e+3
Isotopic Power α (Watt)	0
Isotopic Power α+β (Watt)	1.548e-8
Isotopic Power α+β+γ (Watt)	4.161e-7

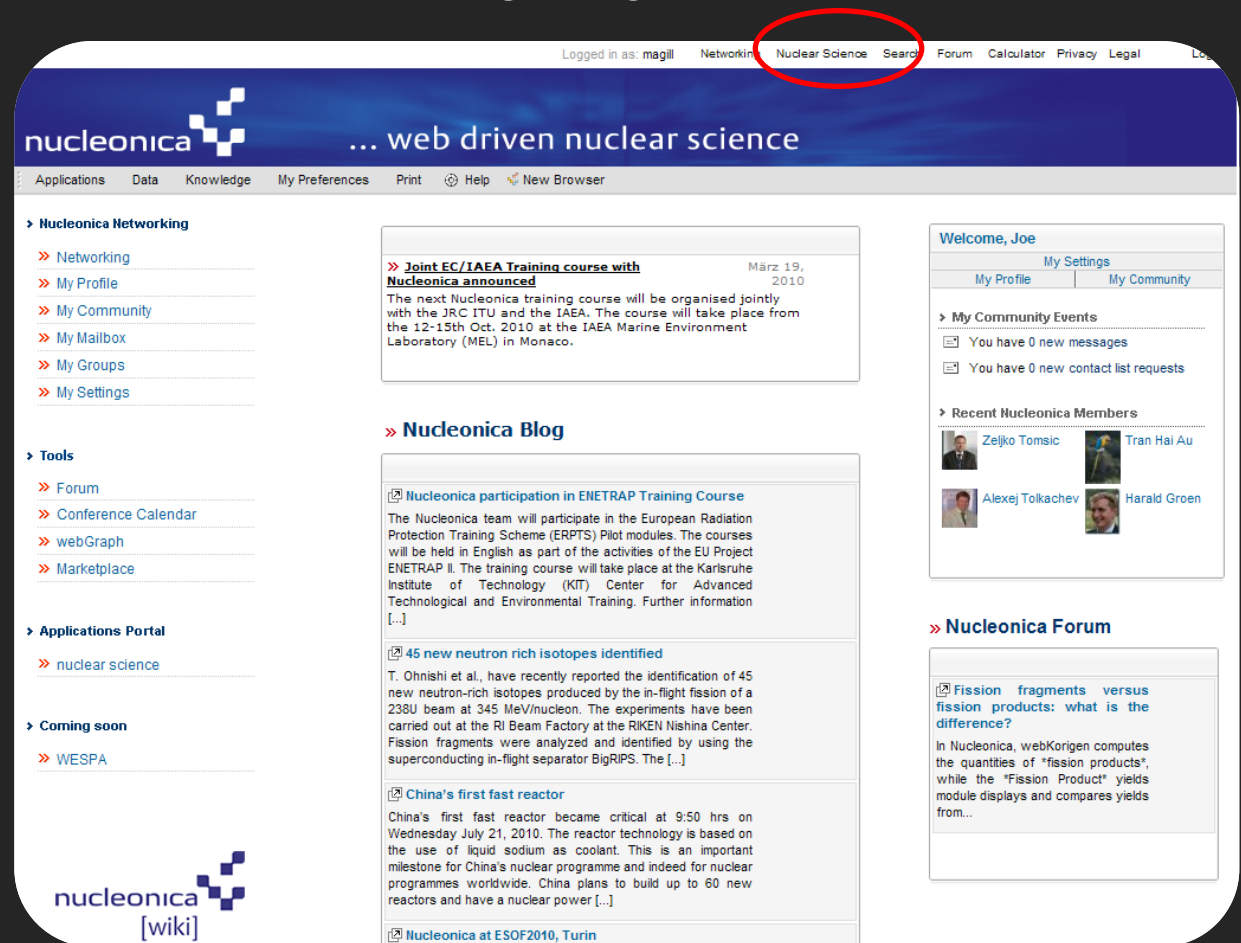
at cm distance (vacuum), Threshold energy

Main Networking page

Login:



www.nucleonica.net



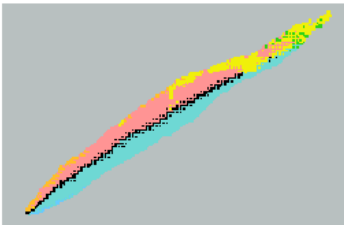
Nuclear Science Application Page...

Logged in as: magill Networking Nuclear Science Search Forum Calculator Privacy Legal

nucleonica ... web driven nuclear science

Applications My Preferences Help

» Nuclide Explorer



» Actual Chart: Karlsruhe

» Search Nucleonica Documentation

Nuclear Data Retrieval

nucleonica [wiki]

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- » easy Monte Carlo (IE only)
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- » Fission Yields

» Knowledge Centre

- » Nuclear News
- » Reading room
- » Frequently asked questions
- » Nuclear News

Welcome, Joe

[Edit Preferences](#) [Administration](#)

MyCommunity Portal

» My Last Nuclides

- 94 Pu239
- 56 Ba133
- 77 Ir192
- 27 Co60
- 53 I123

» My Nuclide Mixtures

- U232(0.4g)+Co60(0.6g)
- Ba-Pu
- U232+Co60
- Transuranics in 1 ton Spent Fuel (4.2% enriched, 50GWd/t, 6 years cooling)
- Natural Uranium

» My Sources

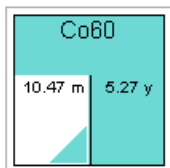
- name3_srce.xml
- Pu239 1 g

» My Messages

No messages for you at the moment

» User Alerts

No alerts at the moment



Mass Activity Calculator 27 Cobalt

Current Chart: Karlsruhe

Element: Mass: Mixture selector

Quantity: Unit:

Convert to:	Quantity
Mass (g)	2.388e-8
Activity (Bq)	1.000e+6
Activity (Ci)	2.703e-5
Number of atoms	2.400e+14
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Isotopic Power α+β (Watt)	1.548e-8
Isotopic Power α+β+γ (Watt)	4.161e-7

at cm distance (vacuum),

navigation

- Main Page
- Community portal
- Current events
- Recent changes
- Random page
- Help
- Glossary

search

toolbox

- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link

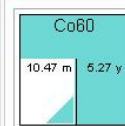
Help:Mass Activity Calculator

Contents [hide]

- 1 Introduction
- 2 Nuclide Selector
- 3 Unit/Quantity Selector
- 4 Unit Conversion
- 5 Simple Decay and the Decay Constant

Introduction

The mass activity calculator is used to convert between the number of atoms, activity (Bq or Ci)



Mass Activity Calculator 27 Cobalt

Actual Chart: Karlsruhe

Element: Mass:

Unit: Quantity:

Unit	Quantity
Grams	1.0000E+00
Becquerel	4.1871E+13
Curies	1.1317E+03
Number of Atoms	1.0048E+22

Mass Activity Calculator interface showing the Nuclide Selector, Unit/Quantity selector, and the Unit/Quantity Table.

Thanks!

